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10/791,314	03/01/2004	Ashok Mantravadi	030213	1802

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EXAMINER	
LEE, SIU M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/791,314	MANTRAVADI ET AL.	
	Examiner	Art Unit	
	Siu M. Lee	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 24 August 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-10,13,16,20,21 and 23-52 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 20 is/are allowed.

6)☒ Claim(s) 1-8,10,13,16,20,21,23-50 and 52 is/are rejected.

7)☒ Claim(s) 9, 51 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 01 March 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 31, 32, 34, 35, 36, 37 are rejected under 35 U.S.C. 102(e) as being anticipated by anticipated by Kadous (US 2003/0165189 A1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

(1) Regarding claim 31, 35 and 37:

Kadous discloses a method comprising:

processing a plurality of received symbol streams, obtained via a plurality of receive antennas (antenna 152a – 152r in figure 6), in accordance with a first

spatial processing scheme (spatial processor 620a in figure 6) to provide a first recovered data symbol stream (detected symbol streams output from the spatial processor 620a) (spatial processor 620a receives and processes the NR received symbol streams from receivers 154a through 154r based on a particular spatial or space-time receiver processing technique to provide NT detected symbol streams, paragraph 0145);

demodulating and decoding the first recovered data symbol stream to obtain a decoded base stream (RX data processor 630a process the detected symbol stream and output a decoded data stream 1, paragraph 0145);

estimating interference due to the decoded base stream (interference canceller 640a estimate the interference, paragraph 0146);

canceling the estimated interference due to the decoded base stream from the plurality of received symbol streams to obtain a plurality of modified symbol streams (the remodulated symbol streams are then subtracted from the first stage's input symbol streams to derive NR modified symbol streams which include all but the subtracted interference components, the NR modified symbol are then provided to the next stage, paragraph 0146);

processing the plurality of modified symbol streams in accordance with a second spatial processing scheme to obtain a second recovered data symbol stream; and demodulating and decoding the second recovered data symbol stream to obtain a decoded enhancement stream (vector y2 is then passed to the next stage and spatial process by the spatial processor 620b and went through

RX data processor 630b to obtain the second recovered data symbol stream to obtain a decoded data stream 2 as shown in figure 6).

(2) Regarding claim 32:

Kadous discloses wherein the base stream and the enhancement stream are received for a broadcast service (it is inherent that a wireless communication system can be used in broadcasting services), wherein the base stream (the first recovered symbol stream) is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better (the data rates may be selected to achieve a specific overall spectral efficiency with a lower minimum "received" SNR, paragraph 0009, paragraph 0080), and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR (higher effective SNR) (the data rates may be selected with a higher overall spectral efficiency fir a specific received SNR, higher effective SNR, the highest effective SNR is achieved for the last recovered symbol stream, paragraph 0080).

(3) Regarding claim 34 and 36:

Kadous discloses the method further comprising:

Repeating the processing the plurality of received symbol streams and the demodulation and decoding the first recovered data symbol stream for a plurality of iterations to obtain the decoded base stream (the processing performed in

steps 212 and 214 in figure 2 is then repeated on the NR modified symbol stream to recover another transmitted symbol stream, paragraph 0055).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 4, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2).

(1) Regarding claim 1:

Wu et al. discloses a method of transmitting a base stream of data and an enhancement stream of data (bit stream 1 and bit stream 2 as shown in figure 5) in a wireless communication system, comprising:

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the base stream to obtain a first data symbol stream (bit stream 1 in figure 5 is being modulated in the QPSK mod block), wherein the base stream is designated to be received by a plurality of receiving entities (for mobile receivers could decode a lower quality video signal, paragraph 0059, lines 12-14);

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the enhancement stream to obtain a second data symbol stream (bit stream 2 in figure 5 is being modulated in the QAM mod block), wherein the enhancement stream is designated to be received by at least one receiving entity (for fixed receivers could decode a higher quality video signal, paragraph 0059, lines 12-14), and wherein the coding and modulating for the base and enhancement streams are not dependent on channel realizations of receiving entities for the base and enhancement streams (the coding and modulating for the base (low priority) and enhancement streams (hi priority) does not dependent on the channel realizations of receiving entities for the base and enhancement streams).

Wu et al. fails to disclose processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, wherein the wireless communication system is a single-carrier communication system.

However, Thomas et al. disclose processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams (transmit weighting unit 3A05, the data stream 3A10 is weighted by transmit weighting unit 3A05 and obtain plurality of data stream, column 3, lines 62-63); processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams (at least one data stream 3A10 is process by the second transmit weighting unit 3A05 and obtain a second plurality of data substream as shown in figure 3A), wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams (the weighting unit controller 3A11 may be provided with channel state information 3A12 but not channel realizations of the receiving entities for the base and enhancement stream); and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas (transmit combiner 3A03 combine the first plurality and the second plurality of data substream and transmit by the plurality of transmitting unit 3A01 and antenna 101 as shown in figure 3A), wherein the wireless communication system is a single-carrier communication system (the wireless communication system as shown in figure 3A is a single-carrier communication system).

It is desirable to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; process the second data symbol stream in accordance with a second spatial

processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, wherein the wireless communication system is a single-carrier communication system because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Thomas et al. with the method of Wu et al. to improve the performance of the method.

(2) Regarding claim 2:

Wu et al. further disclose wherein the base stream and the enhancement stream are transmitted for a broadcast service (page 5, claim 9 discloses that the bit streams are for tiered digital broadcasting).

(3) Regarding claim 4:

Wu et al. fails to disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme or the spatial multiplexing scheme.

However, Thomas et al. further disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit

diversity scheme (the transmit antenna in figure 3A may be used to provide various form of spatial diversity including transmit diversity).

It is desirable to have the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme because it can increase the transmission capacity. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Thomas et al. with the method of Wu et al. to improve the performance of the method.

(4) Regarding claim 5:

Thomas et al. further disclose wherein each of the first and second spatial processing schemes is a transmit diversity scheme (the transmit antenna in figure 3A may be used to provide various form of spatial diversity including transmit diversity, paragraph 0024, lines 3-5).

5. Claims 43, 44, 46, 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Raleigh et al. (US 2003/0072382 A1).

(1) Regarding claim 43:

Wu et al. discloses a method of transmitting a base stream of data and an enhancement stream of data (bit stream 1 and bit stream 2 as shown in figure 5) in a wireless communication system, comprising:

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the base stream to obtain a first data symbol stream (bit stream 1 in figure 5 is being modulated in the QPSK mod block), wherein the base stream is designated to be received by a plurality of receiving entities (for mobile receivers could decode a lower quality video signal, paragraph 0059, lines 12-14);

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the enhancement stream to obtain a second data symbol stream (bit stream 2 in figure 5 is being modulated in the QAM mod block), wherein the enhancement stream is designated to be received by at least one receiving entity (for fixed receivers could decode a higher quality video signal, paragraph 0059, lines 12-14), and wherein the coding and modulating for the base and enhancement streams are not dependent on channel realizations of receiving entities for the base and enhancement streams (the coding and modulating for the base (low priority) and enhancement streams (hi priority) does not dependent on the channel realizations of receiving entities for the base and enhancement streams).

Wu et al. fails to disclose processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base

and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, wherein the wireless communication system is a single-carrier communication system, wherein the wireless communication system is a multi-carrier communication system.

However, Raleigh et al. disclose processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams (TSW 210a in figure 11 spatial process the first data symbol stream z(1,1) to generate the first plurality of data substream, each TSW 210A-C applies a weight vector to the symbol appearing at its input, paragraph 0119, lines 11-12); processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams (each TSW 210A-C applies a weight vector to the symbol appearing at its input, paragraph 0119, lines 11-12), wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams (the TSW 210A-C do not depend on the channel realization of the receiving entity); and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas (the output from the 210A-C are combine in the MT summing junction 211 and being transmitted by the plurality of transmit antenna 51 as shown in figure 11, paragraph 0119, lines 12-13), wherein the

wireless communication system is a multi-carrier communication system (the wireless communication system in figure 11 is a multi-carrier communication system, OFDM system, paragraph 0103).

It is desirable to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; process the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, wherein the wireless communication system is a multi-carrier communication system because it can increase the transmission capacity (paragraph 0124, lines 2-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Raleigh et al. with the method of Wu et al. to improve the performance of the method.

(2) Regarding claim 44:

Wu et al. further disclose wherein the base stream and the enhancement stream are transmitted for a broadcast service (page 5, claim 9 discloses that the bit streams are for tiered digital broadcasting).

(3) Regarding claim 46:

Wu et al. fails to disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme or the spatial multiplexing scheme.

However, Raleigh et al. further disclose wherein the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme (the transmit antenna in figure 11 may be used to provide various form of spatial diversity including transmit diversity).

It is desirable to have the first spatial processing scheme is a transmit diversity scheme or a spatial multiplexing scheme, and wherein the second spatial processing scheme is the transmit diversity scheme because it can increase the transmission capacity. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Raleigh et al. with the method of Wu et al. to improve the performance of the method.

(4) Regarding claim 47:

Raleigh et al. further disclose wherein each of the first and second spatial processing schemes is a transmit diversity scheme (the transmit antenna in figure 11 may be used to provide various form of spatial diversity including transmit diversity).

(5) Regarding claim 13:

Raleigh et al. further discloses wherein the wireless communication system implements orthogonal frequency division multiplexing (OFDM) (the wireless communication system in figure 11 is a multi-carrier communication system, OFDM system, paragraph 0103).

6. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) as applied to claim 1 above, and further in view of Onggosanusi et al. (US 2003/0210750 A1).

Wu et al. and Thomas et al. disclose all the subject matter as discussed in claim 1 except wherein each of the first and second spatial processing is a space-time transmit diversity (STTD) scheme.

However, Onggosanusi et al. discloses a first space-time transmit diversity (STTD encoder) that process the first data stream and generate the output of x1 and x2 and a second space-time transmit diversity (STTD encoder) that process the second data stream and generate the output of x3 and x4 and then transmit by a plurality of antenna as shown in figure 2c, paragraph 0090, lines 1-4).

It is desirable to process the first and second spatial processing is a space-time transmit diversity (STTD) scheme because it provides a better BER. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Onggosanusi et al. in the method of Wu et al. and Thomas et al. to improve the integrity of the signal.

7. Claim 48 rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Raleigh et al. (US 2003/0072382 A1) as applied to claim 43 above, and further in view of Onggosanusi et al. (US 2003/0210750 A1).

Wu et al. and Raleigh et al. disclose all the subject matter as discussed in claim 43 except wherein each of the first and second spatial processing is a space-time transmit diversity (STTD) scheme.

However, Onggosanusi et al. discloses a first space-time transmit diversity (STTD encoder) that process the first data stream and generate the output of x1 and x2 and a second space-time transmit diversity (STTD encoder) that process the second data stream and generate the output of x3 and x4 and then transmit by a plurality of antenna as shown in figure 2c, paragraph 0090, lines 1-4).

It is desirable to process the first and second spatial processing is a space-time transmit diversity (STTD) scheme because it provides a better BER. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Onggosanusi et al. in the method of Wu et al. and Raleigh et al. to improve the integrity of the signal.

8. Claim 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (US 2002/0088005 A1) in view of Ling et al. (US 2003/0003880 A1).

Wu et al. discloses a method of transmitting a base stream of data and an enhancement stream of data (bit stream 1 and bit stream 2 as shown in figure 5) in a wireless communication system, comprising:

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the base stream to obtain a first data symbol stream (bit stream 1 in figure 5 is being modulated in the QPSK mod block), wherein the base stream is designated to be received by a plurality of receiving entities (for mobile receivers could decode a lower quality video signal, paragraph 0059, lines 12-14);

coding (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062) and modulating the enhancement stream to obtain a second data symbol stream (bit stream 2 in figure 5 is being modulated in the QAM mod block), wherein the enhancement stream is designated to be received by at least one receiving entity (for fixed receivers could decode a higher quality video signal, paragraph 0059, lines 12-14),

Wu et al. fails to disclose processing the first data symbol stream in accordance with a transmit diversity scheme or a spatial multiplexing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas, wherein the coding and modulating for the base and enhancement stream are performed in accordance with rates selected based on channel realization of receiving entities for the base and enhancement streams and wherein the coding and modulating for the base and enhancement streams are performed in

accordance with rates selected based on channel realization of receiving entities for the base and enhancement streams.

However, Ling et al. to disclose a TX MIMO processor (TX MIMO processor 120d in figure 4) that processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams (in figure 4, TX MIMO processor 120d demultiplex the modulation symbol stream into a number of subchannel symbol stream, paragraph 0074, lines 6-8, the modulated symbol stream S1 is transmitted on one frequency subchannel, processed by a subchannel MIMO processor 412_x and then demultiplexed by a demultiplexer 414_x); processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams (in figure 4, TX MIMO processor 120d demultiplex the modulation symbol stream into a number of subchannel symbol stream, paragraph 0074, lines 6-8, the modulated symbol stream S_K is transmitted on another frequency subchannel, processed by a respective subchannel MIMO processor 412_a to 412_K and then demultiplexed by a demultiplexer 414_a to 414_K), wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams (the processing of the first and second data symbol stream is depending on the channel state information (CSI), such as signal to noise ratio, paragraph 0044, lines 3-7); and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of

transmit antennas (the output of the demultiplexer 414_x and 414_a-414_K are combined by the combiner 416 to form a modulated symbol vector for each transmit antenna, paragraph 0074, lines 15-18) and wherein the coding and modulating for the base and enhancement streams are performed in accordance with rates selected based on channel realization of receiving entities for the base and enhancement streams (in general, a transmitter system codes and modulates data for each transmission channel based on information descriptive of that channel's transmission capability , this information is typically in the form of full channel state information (CSI) or partial CSI, paragraph 0075, lines 1-5).

It is desirable to processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Ling et al. with the method of Wu et al. to improve the performance of the method.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) as applied to claim 1 above, and further in view of Cartreux et al. (US 2006/0029146 A1).

Wu et al. and Thomas et al. disclose all the subject matter as discussed in claim 1 except wherein the combining includes scaling the first plurality of symbol substream with a first scaling factor to obtain a first plurality of scaled symbol substream; scaling the second plurality of symbol substream with a second scaling factor to obtain a second plurality of scaled symbol substream; and summing the first plurality of scaled symbol substream with the second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams.

However, Catreux et al. discloses the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams (the weighting and combining arrangement 812 in figure 8)

It is desirable to wherein the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams because it allow transmit by multiple antenna and increase the transmit capacity of the system. Therefore, it

would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Catreux et al. in the apparatus of Wu et al. and Thomas et al. to improve the performance of the system.

10. Claims 21, 23, 25, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (US 2002/0088005 A1) in view of Ling et al. (US 2003/0003880 A1) and Cartreux et al. (US 2006/0029146 A1).

(1) Regarding claim 21 and 23:

Wu et al. discloses an apparatus comprising:

a first data processor operative to code and modulate a base stream of data to obtain a first data symbol stream (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062, bit stream 1 in figure 5 is being modulated in the QPSK mod block);

a second data processor operative to code and modulate an enhancement stream of data to obtain a second data symbol stream (during modulation, the bit streams are coded using a forward error correction (FEC) code, paragraph 0062, bit stream 2 in figure 5 is being modulated in the QAM mod block);

Wu et al. fails to disclose (a) a first spatial processor operative to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substream; a second spatial processor operative to process the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substream; and a combiner operative to combine the first plurality of symbol with

the second plurality of symbol substream to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antenna; and (b) wherein the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams.

Regarding (a), Ling et al. to disclose a first spatial processor operative to process the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substream (demux 414a in process in TX MIMO processor 120d demultiplex the modulation symbol stream into a number of subchannel symbol stream, paragraph 0074, lines 6-8) ; a second spatial processor operative to process the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substream (demux 414k in process in TX MIMO processor 120d demultiplex the modulation symbol stream into a number of subchannel symbol stream, paragraph 0074, lines 6-8); and a combiner operative to combine the first plurality of symbol with the second plurality of symbol substream to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antenna (combiner 416a and 416t combiner the first plurality of symbol with the second plurality of symbol substream to obtain a plurality of transmit symbol streams as shown in figure 4).

It is desirable to processing the first data symbol stream in accordance with a first spatial processing scheme to obtain a first plurality of symbol substreams; processing the second data symbol stream in accordance with a second spatial processing scheme to obtain a second plurality of symbol substreams, wherein the processing for the first and second data symbol streams is not dependent on the channel realizations of the receiving entities for the base and enhancement streams; and combining the first plurality of symbol substreams with the second plurality of symbol substreams to obtain a plurality of transmit symbol streams for transmission from a plurality of transmit antennas because it can increase the transmission capacity (paragraph 0088, lines 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Ling et al. with the method of Wu et al. to improve the performance of the method.

Regarding (b), Catreux et al. discloses the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams (the weighting and combining arrangement 812 in figure 8)

It is desirable to wherein the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to

obtain the plurality of transmit symbol streams because it allow transmit by multiple antenna and increase the transmit capacity of the system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Catreux et al. in the apparatus of Wu et al. and Ling et al. to improve the performance of the system.

(2) Regarding claim 25:

Wu et al. further disclose wherein the base stream and the enhancement stream are transmitted for a broadcast service (page 5, claim 9 discloses that the bit streams are for tiered digital broadcasting).

(3) Regarding claim 26:

Wu et al. further disclose wherein the base stream is designated to be received by a plurality of receiving entities (signal with a lower quality video signal is going to be received by all the mobile receivers and the fixed receiver) and the enhancement stream is designated to be received by at least one receiving entity among the plurality of receiving entities (fixed receivers to decode a higher quality video signal, paragraph 0059, lines 12-14).

(4) Regarding claim 27:

Wu et al. further disclose wherein the base stream is designated to be received by a plurality of receiving entities (mobile receivers to decode a lower quality video signal) and the enhancement stream is designated to be received by a second receiving entity (fixed receivers to decode a higher quality video signal, paragraph 0059, lines 12-14).

(5) Regarding claim 30:

Ling further discloses wherein the processing the second data symbol stream includes spatially processing the second data symbol stream in accordance with a spatial multiplexing scheme to obtain the second plurality of symbol stream (demux 414k in process in TX MIMO processor 120d demultiplex the modulation symbol stream into a number of subchannel symbol stream, paragraph 0074, lines 6-8).

11. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Raleigh et al. (US 2003/0072382 A1) as applied to claim 43 above, and further in view of Cartreux et al. (US 2006/0029146 A1).

Wu et al. and Raleigh et al. disclose all the subject matter as discussed in claim 1 except wherein the combining includes scaling the first plurality of symbol substream with a first scaling factor to obtain a first plurality of scaled symbol substream; scaling the second plurality of symbol substream with a second scaling factor to obtain a second plurality of scaled symbol substream; and summing the first plurality of scaled symbol substream with the second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams.

However, Catreux et al. discloses the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to

obtain the plurality of transmit symbol streams (the weighting and combining arrangement 812 in figure 8)

It is desirable to wherein the combiner is operative to scale the first plurality of symbol substream with a first scaling factor, scale the second plurality of symbol substream with a second scaling factor, and sum first plurality of scaled symbol substream with second plurality of scaled symbol substream to obtain the plurality of transmit symbol streams because it allow transmit by multiple antenna and increase the transmit capacity of the system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Catreux et al. in the apparatus of Wu et al. and Raleigh et al. to improve the performance of the system.

12. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (US 2002/0088005 A1) in view of Ling et al. (US 2003/0003880 A1) and Cartreux et al. (US 2006/0029146 A1) as applied to claim 23 above, and further in view of Onggosanusi et al. (US 2003/0210750 A1).

Regarding claim 28 and 29:

Wu et al., Ling et al. and Cartreux et al. disclose all the subject matter as discussed in claim 23 except wherein the processing the first data symbol stream includes spatially processing the first data symbol stream in accordance with a space time transmit diversity scheme to obtain the plurality of symbol substreams.

However, Onggosanusi et al. discloses a first space-time transmit diversity (STTD encoder) that process the first data stream and generate the output of x1 and x2 and a second space-time transmit diversity (STTD encoder) that process the second data stream and generate the output of x3 and x4 and then transmit by a plurality of antenna as shown in figure 2c, paragraph 0090, lines 1-4).

It is desirable to process the first and second spatial processing is a space-time transmit diversity (STTD) scheme because it provides a better BER. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Onggosanusi et al. in the method of Wu et al., Ling et al. and Cartreux et al. to improve the integrity of the signal.

13. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kadous (US 2003/0165189 A1) in view of Walton et al. (US 2003/0125040 A1).

Kadous discloses all the subject matter as discussed in claim 31 except the first spatial processing scheme is a transmit diversity scheme, and wherein the second spatial processing scheme is the transmit diversity scheme or a spatial multiplexing scheme.

However, Walton et al. discloses a transmitter wherein the first spatial processing scheme is a transmit diversity scheme (spatial processor 332a in figure 3E, paragraph 0132), and wherein the second spatial processing scheme is the transmit diversity scheme or a spatial multiplexing scheme (spatial processor 332l in figure 3E, paragraph 0132).

It is desirable to have the first spatial processing scheme is a transmit diversity scheme, and wherein the second spatial processing scheme is the transmit diversity scheme or a spatial multiplexing scheme because it is increase the transmit capacity. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Walton et al. in the method of Kadous et al. to improve the performance of the method.

14. Claims 38, 40, 41, 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,473,467 B1) in view of Kim et al. (US 6,853,677 B2).

(1) Regarding claim 38, 41, and 42:

Wallace et al. discloses a method comprising:

demultiplexing a plurality of received symbol streams, obtained via a plurality of receive antennas (antenna 610A to 610R), to provide a first plurality of received symbol substreams for the base stream and a second plurality of received symbol substreams for the enhancement stream, wherein the base stream is designated to be received by a plurality of receiving entities and the enhancement stream is designated to be received by at least one receiving entity among the plurality of receiving entities (In the partial-CSI or no-CSI processing modes, the transmitter unit can employ a common modulation and coding scheme (e.g., on each data channel transmission), which then can be (in theory) demodulated by all receiver units. In the partial-CSI processing mode, a single receiver unit can specify the C/I, and the modulation employed on all antennas

can be selected accordingly (e.g., for reliable transmission) for that receiver unit. Other receiver units can attempt to demodulate the transmission and, if they have adequate C/I, may be able to successfully recover the transmission. A common (e.g., broadcast) channel can use a no-CSI processing mode to reach all users, column 9, lines 16-27) (a receiver unit 600, having multiple receive antennas, which can be used to receive one or more channel data streams. One or more transmitted signals from one or more transmit antennas can be received by each of antennas 610a through 610r and routed to a respective front end processor 612. For example, receive antenna 610a may receive a number of transmitted signals from a number of transmit antennas, and receive antenna 610r may similarly receive multiple transmitted signals. Each front end processor 612 conditions (e.g., filters and amplifies) the received signal, downconverts the conditioned signal to an intermediate frequency or baseband, and samples and quantizes the downconverted signal. Each front end processor 612 typically further demodulates the samples associated with the specific antenna with the received pilot to generate "coherent" samples that are then provided to a respective FFT processor 614, one for each receive antenna. Each FFT processor 614 generates transformed representations of the received samples and provides a respective stream of modulation symbol vectors. The modulation symbol vector streams from FFT processors 614a through 614r are then provided to demultiplexer and combiners 620, which channelizes the stream of modulation symbol vectors from each FFT processor 614 into a number of (up to L) sub-channel symbol streams. The sub-channel symbol streams from all FFT

processors 614 are then processed, based on the (e.g., diversity or MIMO) communications mode used, prior to demodulation and decoding. For a channel data stream transmitted using the diversity communications mode, the sub-channel symbol streams from all antennas used for the transmission of the channel data stream are presented to a combiner that combines the redundant information across time, space, and frequency. The stream of combined modulation symbols are then provided to a (diversity) channel processor 630 and demodulated accordingly);

processing the first plurality of received symbol substreams in accordance with a first spatial processing scheme to obtain a first recovered data symbol stream (the combining process performed by the combiner in 620 in figure 6, the sub-channel symbol streams from all antenna used for the transmission of the channel data stream are presented to a combiner that combines the redundant information across time, space, and frequency, the stream of combined modulation symbols are then provided to a channel processor 630A and demodulated accordingly, column 24, lines 55-62);

processing the second plurality of received symbol substreams in accordance with a second spatial processing scheme to obtain a second recovered data symbol stream (the combining process performed by the combiner in 620 in figure 6, the sub-channel symbol streams from all antenna used for the transmission of the channel data stream are presented to a combiner that combines the redundant information across time, space, and

frequency, the stream of combined modulation symbols are then provided to a channel processor 630R and demodulated accordingly, column 24, lines 55-62);

demodulating and decoding the first recovered data symbol stream to obtain a decoded base stream; and demodulating and decoding the second recovered data symbol stream to obtain a decoded enhancement stream (the (post-conditioned) symbol sub-streams are then provided to a (MIMO) channel processor 630A and 630R and demodulated accordingly, thus each channel processor 630A and 630R receives a stream of modulation symbols or a number of symbol sub-streams, decoder 640A and 640R that implements a decoding scheme complementary to that used at the transmitter unit for the channel data stream as shown in figure 6, column 25, lines 8-13 and 26-30).

Wallace et al. fails to disclose a time division demultiplexing to obtain a plurality of receiving symbol substreams.

However, Kim et al. discloses the usage of a time division demultiplexer to obtain a plurality of received symbol substream (the processed signals are inputted to the demultiplexer 422 for demultiplexing, which are then transmitted to the storage means 423 consisted of N1 storage, column 5, lines 8-11, column 7, lines 3-10).

It is desirable to use a time division demultiplexing to obtain a plurality of receiving symbol substreams because transmit data rate is variable and thus a certain degree of the flexibility of communication channels can be provided. Therefore, it would have been obvious to one of ordinary skill in the art at the

time of invention to employ the teaching of Kim et al. in the method and system of Wallace et al. to improve the flexibility of the method and system.

(2) Regarding claim 40:

Wallace et al. discloses wherein the first spatial processing scheme is a transmit diversity scheme, and wherein the second spatial processing scheme is the transmit diversity scheme or a spatial multiplexing scheme (as shown in figure 4A, the first spatial processing scheme 430A divides the incoming signal into T substream and transmit by T antennas, the same spatial division processor 430R divides the input into T substream and transmit by T antenna, column 22, lines 8-14).

15. Claim 39 rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,473,467 B1) in view of Kim et al. (US 6,853,677 B2) as applied to claim 38 above, and further in view of Kadous (US 2003/0165189 A1).

Wallace et al. and Kim et al. discloses all the subject matter as discussed in claim 38 except wherein the base stream and the enhancement stream are received for a broadcast service, wherein the base stream is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR.

However, Kadous discloses wherein the base stream and the enhancement stream are received for a broadcast service (it is inherent that a wireless communication system can be used in broadcasting services), wherein the base stream (the first recovered symbol stream) is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better (the data rates may be selected to achieve a specific overall spectral efficiency with a lower minimum "received" SNR, paragraph 0009, paragraph 0080), and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR (higher effective SNR) (the data rates may be selected with a higher overall spectral efficiency fir a specific received SNR, higher effective SNR, the highest effective SNR is achieved for the last recovered symbol stream, paragraph 0080).

It is desirable to wherein the base stream and the enhancement stream are received for a broadcast service, wherein the base stream is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR because it can achieve high performance when limited information is available at the transmitter for the MIMO channel. Therefore, it would have been obvious to one of ordinary

skill in the art at the time of invention to employ the teaching of Kadous et al. in the system and method of Wallace et al. and Kim et al. to improve the performance of the method and system.

16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) as applied to claim 1 above, and further in view of Kadous et al. (US 2003/0165189 A1).

Wu et al .and Thomas et al. disclose all the subject matter as discussed in claim 1 except wherein the base stream is coded, modulated, and spatially processed for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR.

However, Kadous discloses wherein the base stream and the enhancement stream are received for a broadcast service (it is inherent that a wireless communication system can be used in broadcasting services), wherein the base stream (the first recovered symbol stream) is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better (the data rates may be selected to achieve a specific overall spectral efficiency with a lower minimum "received" SNR, paragraph 0009, paragraph 0080), and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or

better, where the second SNR is higher than the first SNR (higher effective SNR) (the data rates may be selected with a higher overall spectral efficiency fir a specific received SNR, higher effective SNR, the highest effective SNR is achieved for the last recovered symbol stream, paragraph 0080).

It is desirable to wherein the base stream and the enhancement stream are received for a broadcast service, wherein the base stream is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR because it can achieve high performance when limited information is available at the transmitter for the MIMO channel. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kadous et al. in the method of Wu et al. and Thomas et al. to improve the performance of the method.

17. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (US 2002/0088005 A1) in view of Ling et al. (US 2003/0003880 A1) and Cartreux et al. (US 2006/0029146 A1) as applied to claim 23 above, and further in view of Kadous et al. (US 2003/0165189 A1).

Wu et al., Cartreux et al and Ling et al. disclose all the subject matter as discussed in claim 23 except wherein the base stream is coded, modulated, and

spatially processed for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR.

However, Kadous discloses wherein the base stream and the enhancement stream are received for a broadcast service (it is inherent that a wireless communication system can be used in broadcasting services), wherein the base stream (the first recovered symbol stream) is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better (the data rates may be selected to achieve a specific overall spectral efficiency with a lower minimum "received" SNR, paragraph 0009, paragraph 0080), and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR (higher effective SNR) (the data rates may be selected with a higher overall spectral efficiency fir a specific received SNR, higher effective SNR, the highest effective SNR is achieved for the last recovered symbol stream, paragraph 0080).

It is desirable to wherein the base stream and the enhancement stream are received for a broadcast service, wherein the base stream is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed

at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR because it can achieve high performance when limited information is available at the transmitter for the MIMO channel. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kadous et al. in the method of Wu et al., Cartreux et al. and Ling et al. to improve the performance of the method.

18. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Raleigh et al. (US 2003/0072382 A1) as applied to claim 43 above, and further in view of Kadous et al. (US 2003/0165189 A1).

Wu et al., and Raleigh et al. disclose all the subject matter as discussed in claim 23 except wherein the base stream is coded, modulated, and spatially processed for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR.

However, Kadous discloses wherein the base stream and the enhancement stream are received for a broadcast service (it is inherent that a wireless communication system can be used in broadcasting services), wherein the base stream (the first recovered symbol stream) is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities

achieving a first signal-to-noise ratio (SNR) or better (the data rates may be selected to achieve a specific overall spectral efficiency with a lower minimum "received" SNR, paragraph 0009, paragraph 0080), and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR (higher effective SNR) (the data rates may be selected with a higher overall spectral efficiency fir a specific received SNR, higher effective SNR, the highest effective SNR is achieved for the last recovered symbol stream, paragraph 0080).

It is desirable to wherein the base stream and the enhancement stream are received for a broadcast service, wherein the base stream is coded, modulated, and spatially processed at a transmitting entity for recovery by receiving entities achieving a first signal-to-noise ratio (SNR) or better, and wherein the enhancement stream is coded, modulated, and spatially processed at the transmitting entity for recovery by receiving entities achieving a second SNR or better, where the second SNR is higher than the first SNR because it can achieve high performance when limited information is available at the transmitter for the MIMO channel. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kadous et al. in the method of Wu et al. and Raleigh et al. to improve the performance of the method.

19. Claims 7, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Thomas et al. (US 6,987,819 B2) as applied to claim 1 above, and further in view of Kasapi et al. (US 2006/0099955 A1).

(1) Regarding claim 7:

Thomas et al. further discloses that the first spatial processing scheme is a transmit diversity scheme.

Wu et al. and Thomas et al. disclose all the subject matter as discussed except the second spatial processing scheme is a spatial multiplexing scheme.

However, Kasapi et al. discloses a spatial processing scheme that is a spatial multiplexing scheme (spatial multiplexer 66 produce spatial multiplexed signal 68 to be transmitted by a bank of multi-channel transmitter 70 using transmit antenna array 18 as shown in figure 1, paragraph 0028, lines 14-19).

It is desirable to use a spatial processing scheme that is a spatial multiplexing scheme because it improves the signal-to-noise ratio (SNR) and increases throughput. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kasapi et al. in the method of Wu et al. and Thomas et al. to improve the performance of the method.

(2) Regarding claim 8:

Wu et al. and Thomas et al. disclose all the subject matter as discussed in claim 1 except the first and second spatial processing scheme is a spatial multiplexing scheme.

However, Kasapi et al. discloses a spatial processing scheme that is a spatial multiplexing scheme (spatial multiplexer 66 produce spatial multiplexed signal 68 to be transmitted by a bank of multi-channel transmitter 70 using transmit antenna array 18 as shown in figure 1, paragraph 0028, lines 14-19).

It is desirable to use a spatial processing scheme that is a spatial multiplexing scheme because it improves the signal-to-noise ratio (SNR) and increases throughput. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kasapi et al. in the method of Wu et al. and Thomas et al. to improve the performance of the method.

20. Claims 49, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (2002/0088005 A1) in view of Raleigh et al. (US 2003/0072382 A1) as applied to claim 43 above, and further in view of Kasapi et al. (US 2006/0099955 A1).

(1) Regarding claim 49:

Raleigh et al. further discloses that the first spatial processing scheme is a transmit diversity scheme.

Wu et al. and Thomas et al. disclose all the subject matter as discussed except the second spatial processing scheme is a spatial multiplexing scheme.

However, Kasapi et al. discloses a spatial processing scheme that is a spatial multiplexing scheme (spatial multiplexer 66 produce spatial multiplexed

signal 68 to be transmitted by a bank of multi-channel transmitter 70 using transmit antenna array 18 as shown in figure 1, paragraph 0028, lines 14-19).

It is desirable to use a spatial processing scheme that is a spatial multiplexing scheme because it improves the signal-to-noise ratio (SNR) and increases throughput. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kasapi et al. in the method of Wu et al. and Raleigh et al. to improve the performance of the method.

(2) Regarding claim 50:

Wu et al. and Raleigh et al. disclose all the subject matter as discussed in claim 1 except the first and second spatial processing scheme is a spatial multiplexing scheme.

However, Kasapi et al. discloses a spatial processing scheme that is a spatial multiplexing scheme (spatial multiplexer 66 produce spatial multiplexed signal 68 to be transmitted by a bank of multi-channel transmitter 70 using transmit antenna array 18 as shown in figure 1, paragraph 0028, lines 14-19).

It is desirable to use a spatial processing scheme that is a spatial multiplexing scheme because it improves the signal-to-noise ratio (SNR) and increases throughput. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Kasapi et al. in the method of Wu et al. and Raleigh et al. to improve the performance of the method.

Allowable Subject Matter

21. Claim 20 is allowed.

22. Claims 9 and 51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fan (US 2003/0012315 A1) discloses a system and method for multistage error correction coding wirelessly transmitted information in a multiple antennae communication system. Wu et al. (US 2007/0036069 A1) discloses an adaptive tie diversity and spatial diversity for OFDM. Walton et al. (US 2002/0154705 A1) discloses a high efficiency high performance communication system employing multi-carrier modulation. Medvedev et al. (US 2003/0157954 A1) discloses power control for partial channel state information (CSI) multiple-input, multiple-output (MIMO) system. Walton et al. (US 2003/0128658 A1) discloses a resource allocation for MIMO-OFDM communication systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Siu M. Lee whose telephone number is (571) 270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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